THE AUSTRALIA PROGRAM
TROPICAL REEFS & RAINFORESTS
FALL 2023
SEPTEMBER 29 – NOVEMBER 11

ACADEMIC SYLLABUS

Faculty: Jenna Spackeen, PhD

Contact Hours: We will be in close contact for the duration of the course, and there will be plenty of opportunities for students to meet with the faculty. Additionally, there will be a number of "check-in days", where we will arrange student-faculty meetings. Students are encouraged to engage with faculty to discuss assignments or any other personal issues or concerns as needed.

Class Meetings: The Wildlands Studies Program in Australia involves seven days per week of instruction and field research with little time-off. Faculty and staff work directly with students 6-10+ hours a day and are available for tutorials and coursework discussion before and after scheduled activities. Typically, scheduled activities for the day will begin at 9 am, with breaks for meals, however; our day may begin much earlier and end much later so students need to have a flexible mindset while on the program. Scheduled actives will include a variety of things including but not limited to lectures, discussions, hikes, and field research. Students should also expect to spend a few hours a day studying, writing in their journals, and completing readings. It is necessary for students to have a flexible attitude and to be able to accommodate a variety of class, activity, and independent study times.

Course Credit: Students enrolled in a Wildlands Studies Program receive credit for three undergraduate courses. These three courses have distinct objectives and descriptions, and we integrate teaching and learning through formal learning situations (lectures and seminars), field work, field surveys and hands-on activities. Academic credit is provided by Western Washington University. Extended descriptions follow in the course description section of this syllabus.

1. **ESCI 497T, Environmental Wildlands Studies (5 quarter units / 3.35 semester credits)** – Field study of the ecology, geology, and environmental challenges of our study region, including the role of human interactions.
2. **ESCI 497U, Environmental Field Survey (5 quarter units / 3.35 semester credits)** – Study and application of field surveys, sampling methodologies, ecosystem restoration techniques, data management, including on-site data collection, assessment, and analysis.
3. **ESCI 497V, Wildlands Environment and Culture (5 quarter units / 3.35 semester credits)** – Study of social-ecological systems, drawing on locally relevant cultural perspectives and historic and present-day human relationships with the landscape, the environment, and wildlife. Includes group dialogue and personal reflection to track one's own learning.

Readings: Students will be required to complete readings from a course reader. The course reader, including primary literature, excerpts, and technical reports, will be compiled and sent to students in advance of the program. Students are encouraged to bring their own personal copy with them, and it is best to print it out (it's easiest to print it double sided and have it bound). You may also bring an electronic copy downloaded on a tablet/device; however, the opportunity to charge devices will not always be available so it is recommended that you bring a printed copy. Additional field guides and texts that are used to supplement field activities will be carried around in a shared reference library.

Contents of this syllabus:

I. Program Overview

Prepare to explore awe-inspiring environments characterized by rugged coastlines, coral reefs, spectacular mountains, lush rainforests, and fascinating geological features. Our Australia Program will traverse one of the most diverse tropical ecosystems on the planet, while conducting studies to understand the ecology, geology, and culture that are unique to this majestic place.

Our field study will take us to North Queensland's most striking landscapes for an in-depth investigation of this wondrous tropical environment and seascape. This corner of Australia is of national and international significance due to its abundance of unique and threatened ecosystems and wildlife. We will spend six weeks studying the stunning ecological diversity of the tropical north, from the coastal rainforests of the Wet Tropics (the world's oldest tropical rainforest ecosystem), to the famed but imperiled Great Barrier Reef marine ecosystem (the world's largest coral reef system), to the edge of the Outback (the arid rangelands that dominate Australia's interior).

Because the Australian island-continent is geographically isolated, the ecosystems that have evolved to thrive in this part of the world are vulnerable. They face existing and emerging environmental stressors that threaten biodiversity. A rapidly changing environment highlights the importance of research and monitoring efforts so that long term biological and physical trends can be determined. Students on this program will become skilled at identifying the flora, fauna, and geological features that characterize the landscape, and they will have the opportunity to learn about and assist in research and conservation efforts. A particular emphasis will be placed on the biological and physical processes that impact our planet's climate, the human dimension of conservation and management, and on the interconnectedness of terrestrial and marine ecosystems. Additionally, with local community members, as well as land and protected area managers, we will examine the history of land use, and learn about the role of the Indigenous peoples in sustaining the landscape and their spiritual ties with it.

Northern Queensland is the perfect setting to collectively study the impacts of humans and climate change on tropical ecosystems, and our field activities will provide you with authentic experiences applicable toward your future endeavors. You will leave Queensland with a deep respect for its culture, landscape, and the surrounding marine environment, and a holistic understanding of the unique challenges faced by this region. You will also be challenged to think critically and realistically about actions that can be taken to solve complex, environmental issues.

Team Activities & Program Itinerary

We will start our program in Cairns (North Queensland, Australia), and spend the first part of the program exploring the Wet Tropics and coral reef ecosystems that flourish in this part of the world. Expansive rainforest, white sandy beaches, fringing reefs, and sheltered coves provide premier sites to initiate our field studies. Prepare to be immersed in rainforests that have been standing for over a million years, such as the Daintree, and snorkel among the spectacular coral that inhabit Australia's Great Barrier Reef. In this region of Queensland, we will gain an acute understanding of why this part of the world is conducive for supporting rainforests and coral reefs as we hone our skills as naturalists, conduct a marine debris project, study fish behavior, and contribute toward monitoring efforts. In addition to its outstanding ecological value, North Queensland is also teeming with opportunities to learn about Australia's culture. As the world's oldest surviving culture, the Australian Indigenous people have long interacted with the land and the sea. We will discuss how the dynamism and diversity of the environment is intimately connected to human history, while analyzing the modern efforts to continue to steward the land in the shadow of colonization and ensuing development.

We will continue our studies by visiting the Atherton Tablelands, Sheoak Ridge Nature Preserve, and the Undara Volcanic National Park, where we will examine how plate tectonics, volcanism, and geology have ultimately given rise to endemic species and unique flora and fauna adaptations that can be found nowhere else on the planet. We will meet with experts in the field, complete our research projects, and critically analyze how conservation strategies can mitigate climate impacts and build resiliency into some of our planet's most fragile ecosystems.

As we make our way further south along the coast of Queensland, we will explore coastal mangrove and estuarine habitats, and we will continue our studies on coral reefs. Here, we will deepen our understanding of the connectivity between the land and the sea, and we will pay special attention to the impacts of climate change, learning in depth about ocean acidification, coral bleaching, and sea level rise. After we complete our marine debris study and, hopefully, embark on a backpacking field study along the coast, we will head back to Cairns, where we will celebrate the successful completion of the program, and, finally, go our separate ways.

The Australian landscape has so much to offer. To experience several of the landscapes and ecosystems that characterize the northern region of Queensland, we'll spend a good amount of time traveling. **We will use rental vans to make our way around, primarily camping, with a few nights spent in rustic lodging.** The program is guaranteed to provide unparalleled learning opportunities and an adventure of a lifetime.

II. Learning Objectives

We have multiple goals for our Australia Program. We will traverse North Queensland to learn about marine and terrestrial ecosystems, participate in research, and engage with local communities and various stakeholders to understand pressing environmental challenges, conservation success stories, the connection between science and policy, and Australian culture. Students will have the opportunity to participate in ecosystem monitoring and they will complete individual and group research projects. We will be based out of nature preserves, national parks, and remote campgrounds as we hone our skills as naturalists and learn through observation, discussions, journaling, and lectures. The overarching themes that will be covered during the program are described below.

1) Biogeography and Natural History

How did the Australian continent form? What flora and fauna exist in Australia? Why is this small continental landmass the perfect setting for the evolution of endemic species? Students will answer these questions and more by exploring interesting geologic phenomena, including old lava flows, crater lakes, and lava tubes, and hiking through rainforests to identify key species. Through investigations of the various habitats that characterize North Queensland, student will gain an in depth understanding of the interconnectedness between geology and ecology, and how landscapes change over time and facilitate the evolution of unique species.

2) Changing Seas, Coral Reefs, Carbon, and Climate
Why do some corals appear white, while others are more colorful? What conditions off the coast of Queensland have allowed for the development of a reef structure so large that it can be seen from space? Students will learn how coral reef ecosystems form over thousands of years and why these delicate marine environments are so sensitive to change. Student will have the opportunity to snorkel and complete studies on the Great Barrier Reef, and investigate how warmer seawater, ocean acidification, pollution, and rising sea level may alter the marine environment. Students will also gain a deep understanding of carbon cycling, and they will learn how the ocean plays a key role in carbon transport, storage, and regulating the climate on our planet.

3) The Importance of Monitoring, Research, Collaborations, and Critical Thinking
How are conservation efforts being implemented across the Great Barrier Reef? What types of marine debris are more prominent on offshore islands compared to the coast? Students will have the opportunity to spend time at nature preserves and national parks where they will be able interact with local researchers and conservationists. Students will critically analyze scientific manuscripts, complete a project focused on marine debris, and assist with ongoing monitoring efforts. Students will ask their own questions, collect data, analyze results, consult scientific literature, and work in small groups to develop their own research projects. Through active participation in the scientific process, coupled with field observations, unique wildlife encounters, and engaging with experts, students will learn to think critically about complex environmental issues.

4) Australian Culture and Society: Past, Present, and Future
How did humans get to Australia and how did European contact influence the history and culture of the region? How has regional geography inspired the cultural traditions and beliefs of the Indigenous Australians? How have people persisted in such a rugged environment and how will they adapt to future changes? From the early settlement of the landmass to modern Australia, students will gain an in depth understanding of the rich history and culture that exists in this part of the world with an emphasis on indigenous perspectives.

5) Environmental Policy, Sustainability, Conservation, and Social Science
Will Australia recover from deforestation that has fragmented the land and decreased biodiversity? How is traditional knowledge being used to reinstate age-old burning practices? What policies are in place to keep beach goers safe from Australia's dangerous wildlife? Questions pertaining to conservation challenges, environmental pressures, and sustainability will be discussed and analyzed. Students will engage with stakeholders, critically analyze environmental policy case studies, and investigate the human element of environmental science.

6) Energy and the Environment
With steady trade winds and an abundance of sunlight, are renewable energy sources being utilized in Australia? Students will learn about different energy sources, discuss the pros and cons of each, and critically make connections between energy production, carbon cycling, and global climate.

7) Basic backcountry skills, including backpacking and field navigation
Although not the focus of this course, students will gain experience in planning for a backpacking trip, how to travel safely and mitigate risk, and how to cook in a backcountry setting.

These topics will be addressed through lectures, group discussion, course readings, field activities, interacting with local experts, participating in ongoing research and conservation efforts, and field research projects. Our overarching goal is to have students leave the course with an extensive knowledge of our region, a set of broader skills, and an understanding of various aspects of ecology, geology, oceanography, environmental science, and social science. The knowledge and skills that are gained during the program will allow students to critically evaluate information in other settings in their future lives and careers. ***Note that prior field research experience is not required. All necessary skills will be taught on-site in Australia.*** Our primary requirement is that you are enthusiastic, adaptable, genuinely open-minded, and ready and willing to learn. We look forward to you joining us and sharing this once-in-a-lifetime experience together.

III. Course Descriptions

We teach these three courses in an integrated format in the field. However, students will receive transcript credit for the following three courses, as introduced on page 1:

ESCI 497T, Environmental Wildlands Studies (5 quarter / 3.35 semester credits) – Field study of the flora, fauna, ecology, marine systems, geology, geography, and natural history that characterize northeast Australia, including historical, current, and future environmental challenges associated with humans.

Experiences/Activities: In this course, students will learn about different geologic features and the dominant flora and fauna that are found throughout northeast Australia. They will study the Wet Tropics, the Great Barrier Reef and surrounding marine ecosystems, and they will learn how the ocean, carbon cycling, and climate are intrinsically connected. Several complicated environmental issues will be analyzed during the program, and students will learn directly through attentive observation, hands-on experience, as well as through guidebooks, lectures, peer presentations, discussions, and stakeholder interactions.

Before the start of the program, students will be required to prepare an oral presentation on an assigned topic that relates to Australian fauna. Students will deliver their presentations on-site, acting as the local "expert" on the topic. Additionally, students will create a detailed field journal during the course as they record their observations and personal accounts of the places that they learn about and explore.

Outcomes: Students will develop their skills as naturalists, and they will be able to demonstrate an understanding of the ecology and geology of Australia and the human impacts that have shaped the country over time. Students will be able to critically analyze complex environmental challenges pertinent to Australia and to tropical environments as a whole.

Evaluation/Assessment:

Field Journal	45%
Oral Presentation	15%
Field Quizzes	10%
Final Exam	20%
Participation & Discussions	10%

ESCI 497U, Environmental Field Survey (5 quarter units / 3.35 semester credits) – Study and application of field surveys, sampling methodologies, ecosystem restoration techniques, including on-site data collection, assessment, and analysis at various marine and terrestrial sites in Australia.

Experiences/Activities: Students will learn the essentials of conducting research in the field, and they will become familiar with the overall research process. This course will teach some common techniques and methodologies that are used by scientists to monitor ecosystem structure and function. Students will identify species and geologic features, conduct surveys along transects, complete population counts of certain species, and study marine debris. Students will gain an understanding of how citizen science can assist with long-term research efforts, and how coordinated monitoring efforts between entities are critical for scientific advancement.

Observation logs, participation in data collection and analysis, and completion of student research projects will be evaluated for effort, critical analysis, concept, and clarity. Students will also complete a class research project and lab write-up focused on marine debris.

Outcomes: Students will develop skills in field observation, research methodologies, data collection, and data interpretation. Students will be able to critically read, evaluate, and discuss primary literature and reports, and they will gain a thorough understanding of designing, implementing, and conducting research. Through assisting researchers with monitoring and conservation efforts, and by designing their own research projects, students will become familiar with the process of scientific investigation and collaboration.

Evaluation/Assessment:

Field Data Notebook	30%
Marine Debris Class Project	15%
Research Project	15%
Field Quizzes	10%
Final Exam	20%
Participation & Discussions	10%

ESCI 497V, Wildlands Environment and Culture (5 quarter units / 3.35 semester credits) – Study of social-ecological systems of Australia drawing on locally relevant cultural perspectives and historic and present-day human relationships with the landscape, the environment, and wildlife. Includes group dialogue of the readings and personal reflection to track one's own learning.

Experiences/Activities: In this course students will learn about the culture of Australia with an emphasis on north Queensland and indigenous perspectives. Students will understand how the culture of the region it is deeply tied to the environment and the land. Students will learn about the history of Australia spanning from early settlements to modern culture. They will become familiar with common Australian traditions and livelihoods, and they will learn about Dreamtime. Students will familiarize themselves with relevant Traditional Ecological Knowledge, and they will engage with locals in the community to deepen their understanding of the complexities associated with cultural preservation and the tensions between ecological and economic objectives.

During this course, the cultural journal will be used to record key information provided by local guest speakers, and it will be a safe space for students to reflect on cultural interactions, think critically about the complex relationships that exists between humans and the environment, and gain an awareness of their personal worldview. Students will also build a cultural dictionary of words, expressions, and cultural concepts that they learn during their time in Australia. Additionally, as we make our way through the cultural readings, students will be assigned certain sections to provide thoughtful dialogue and summaries to the rest of the class.

Outcomes: Students will gain a deep appreciation and respect for Australian culture and for the people who inhabit the southern-most inhabited continent. They will understand how historical events and the landscape have shaped the way that Australian society has evolved. They will become familiar with terms and sayings that are unique to Australia, and they will learn about traditions, perspectives, and belief systems that characterize the Indigenous Australians (e.g. Dreamtime). They will be able to critically assess the strategies that Australia is practicing to minimize environmental impacts while meeting the demands of a modern world. Students will also develop a heightened awareness of their own worldview through thoughtful reflections.

Evaluation/Assessment:

Cultural Journal	40%
Reading Summary Narrative	10%
Final Reflection	10%
Field Quizzes	10%
Final Exam	20%
Participation & Discussions	10%

IV. Assessment

Below is an overview of the academic requirements for the program. Some of the assignments are ongoing (e.g. journals, readings, presentations, quizzes) and others have specific dates (e.g. exams, essays, projects). Due dates are subject to change in response to local variables. Final grades will be based on the following items:

Course Number	Assessment Item	Due Dates *specific dates assigned during course	Percent of Grade
ESCI 497T	Field Journal	Checks throughout and in the last week	45
	Oral Presentations	Throughout	15
	Field Quizzes	Throughout	10
	Final Exam	8-Nov	20
	Participation	Throughout	10
ESCI 497U	Field Journal	Checks throughout and in the last week	30
	Marine Debris Project	Week 5 of the course	15
	Research Project	Week 4 of the course	15
	Field Quizzes	Throughout	10
	Final Exam	8-Nov	20
	Participation	Throughout	10
ESCI 497V	Cultural Journal	Checks throughout and in the last week	40
	Reading Narrative	Throughout	10
	Final Reflection	Last week of the course	10
	Field Quizzes	Throughout	10
	Final Exam	10-Nov	20
	Participation	Throughout	10

ESCI 497T, Environmental Wildlands Studies (5 quarter / 3.35 semester credits)

1. Field Journal – 45%

The field journal is an integral part of the Australia program and the ESCI 497T course. It serves as a learning tool and is an opportunity to closely become aware of the surrounding environment, document observations and places that we visit, and reflect on experiences. The field journal will be ongoing throughout the course, and students are encouraged to regularly keep up with their journal assignments. The field journal will consist of creating natural history journal entries adapted from the Grinnell Method, and other nature writing approaches (see Parker article).

Class notes and personal notes are not included as formal journal entries, although we do encourage students to take notes, as they will be useful for crafting journal entries, for other assignments, and for studying for exams. Students will be instructed on the best way to organize their journal at the start of the program, and the journal will be collected periodically during the program for review and in the last week of the program for a final review.

Field journals will consist of the following components:

i) Grinnell Trip Logs (10%): Approximately two entries from locations as prescribed by the instructors. This adapted Grinnell Trip Log is a structured, descriptive narrative that documents select hikes and field walks. The log is a careful summary of observations and field notes taken throughout the day. The entry usually takes about 2 hours to write-up, but may take longer depending on the length of the walk. Your entry should include the 10 essential elements outlined below:

1. **Date & Times:** Head your trip log entry with the date(s) of the trip and the times (start and end)
2. **Location:** Give the name of the area and the name of the hiking trail/route. If available, include start/end GPS coordinates.
3. **Weather:** Start/end conditions and notable weather changes that occur during the trip, e.g. temperature, % cloud cover, rain, fog, wind direction, etc…
4. **Route Description & Map:** Concise description of the route travelled, with distances, times, notable markers or changes in direction. Sketch route map with key features including north arrow.
5. **Habitat(s):** Broad description of the area's habitat types (e.g. glacial morraine, lava field, geothermal lands), noting changes in habitat type and ecological/geological changes that occur along the trail.
6. **Flora and Fauna:** Descriptions of dominant/notable vegetation that is found and sightings of any animals (Note any interactions/associations between the biological/physical landscape that you notice)
7. **Geography:** Descriptions (and names if available) of the prominent geological features (e.g. glaciers, mountains, waterfalls, etc.) that we see during the trip.
8. **General Commentary:** A brief personal summary that reflects on the hike and/or other notable observations (e.g. soils, debris, leaf litter, scat, etc..)
9. **Observation Descriptions & Sketches:** Descriptions of 3-5 species/geological features that you observed, Sketch the species/feature and label.
10. **Two Questions:** Conclude with two detailed questions about ecological/geological phenomena encountered that got you wondering.

Grading of Grinnell Trip Log entries will use the following criteria:

- Organization: Entries are written in an organized way and should follow a logical format that is consistent with the established criteria listed above.
- Completeness: Includes the essential elements and prescribed entries have been completed.
- Accuracy of Content: Provides an accurate and comprehensive reflection of phenomena encountered during the trip (e.g. correct descriptive data, features seen, species encountered).
- Clarity: The entry should be well-written, easy to read, and should be prepared so that others can use it as reference.
- Effort: The entries should demonstrate that concerted effort has been invested into the process.

ii) Nature Writing (25%): From locations as prescribed by the instructors, approximately four to five entries. These entries involve deeper and more creative reflection and require students to focus in on the ecological and physical aspects of their sensory experiences. The emphasis is on the phenomena that the student actually senses and experiences, it is not meant to be a summary of information that they learned or read that day. Entries should be inspired by and related to the specific place and will typically be completed on site (e.g. silent observation while sitting in a single spot).

Grading of Nature Writing entries will use the following criteria:

- Use of Language: Using rich creative language (e.g. metaphor, simile, alliteration, onomatopoeia).
- Diversity of Expression: Employing a diversity of writing/journaling techniques (e.g. poetry, dialogue).
- Sensory Detail: Encapsulating a range of sensory detail (sight, sound, smell, touch, etc.).
- Natural Descriptions: Making clear links to ecological observations with your writings.
- Wider Reflection: Using the scene and your observations to generate wider reflections on nature.

iii) Other Assignments (10%): Refers to any other specific journal activity or assignment given by the instructors throughout the program, and may include field survey exercises, ethology exercises, sketches, and opportunistic observation activities.

2. Oral Presentations – 15%
Students will be assigned a topic approximately a few weeks before the start of the program. Leading up to the program, students will research their assigned topic and come prepared to give a presentation (10-15 minute presentation + 5 minutes for questions/discussion). Topics will relate to the fauna of Australia, and students will have to answer a research question related to their topic. On the day that the presentation is given, students will turn in a 1-2 page summary of bulleted information.

Grading of Oral Presentations will use the following criteria:

- Content: Information delivered is relevant, accurate, original, creative, and coverage is appropriate.
- Structure: Presentation has a logical flow and adheres to the time limit.
- Delivery: Student gives presentation in an engaging manner with good posture and is well spoken.
- Discussion: Student is able to answer questions and generate/facility discussion around the key points.
- Bullet Point Summary: 1-2 page overview of key points of their assigned topic. The summary can be handwritten or typed/printed out. The summary must include a reference list (e.g. articles, books, websites, personal sources, etc..), and students must use a minimum of three different primary sources. Plagiarism (i.e. cut/paste verbatim) will not be accepted.

3. Field Quizzes – 10%
During the course at least two field quizzes will be administered to test the student's knowledge of the ecological, geological, and environmental concepts that have been covered during the course.

4. Final Exam – 20%
In the last few days of the program, students will take a written exam to assess their understanding of key themes and concepts related to ecology, geology, oceanography, geography, and environmental issues that were addressed throughout the course. The exam will include short and long essay questions that assess the student's ability to demonstrate thorough comprehension of themes covered during the program.

5. Participation & Discussions – 10%
Includes general engagement with the subject matter, attentiveness during peer presentations and lectures, and active participation in group readings and discussions.

ESCI 497U, Environmental Field Survey (5 quarter / 3.35 semester credits)

1. Field Journal – 30%
The field journal is an integral part of the Australia program and the ESCI 497U course. It is used to document our various field activities, and as a way to keep track of the different ecosystems, flora, fauna, and geological features that we encounter along our journey.

Students will be instructed on the best way to organize their field journal at the start of the program, and the journal will be collected periodically during the program for review and in the last week of the program for a final review.

The field journal will consist of the following component:

Field Study Log (30%): The field study log will be used to keep track of the regions that we visit during our time in Australia, to note an interesting observation from each region, and to document notable flora, fauna, and features that we encounter at each study locale. The log is not meant to include everything that we see. It is a tool to describe the regions that we visit, hone our observation skills, and document species that are dominant, that you find interesting, or are rare sightings (e.g. whales, foxes, etc.). You may also include geological features (e.g. craters, waterfalls, etc.) in your log. The log should be organized by region where we camped or spent extended

periods of time (e.g. Fitzroy Island, Daintree, Tablelands), listing the date(s) that we spent in region with a description of the region followed by an "In this region I noticed…."entry, and species/notable features that were encountered in the area. Approximately 5 species/notable features should be included per region, and some students find that sketches and/or pressing plants into the notes section is useful.

The log should follow the example template below:

Region:	**Dates:**	
Description: *A broad description (paragraph or two) that provides an overview of the region. Where is this region located? Are there any prominent geographical features that characterize the region? What type of ecosystems exist in the region? What is the climate like in this region?*		
• ***"In this region I noticed…."*** Description of a specific ecological or geological phenomena that you observed in the region (e.g. species interaction) that ignited your sense of curiosity or newfound learning. Describe the observation and explain why you think this observation occurred.		
Species/Features from the Region		
Species/Feature Name Include latin name if available.	Specific Site If known, include the specific site within the general region	Notes Relevant notes about the observation (e.g. behavior, appearance, key characteristics, etc.). You may include a sketch if you'd like.

Grading of the Field Study Log will use the following criteria:

- Organization: The log is neat and is organized according to the above format.
- Consistency of Use: Includes each region that we visit and demonstrates attention to key species and features that we see.
- Effort: Reasonable effort has been invested into the process (i.e. Latin names are included when possible and thoughtful, detailed descriptions, observations, and notes are provided)

2. Marine Debris Project – 15%

At select coastal locations, students will complete a class marine debris project as they participate in a beach cleanup. Students will use field survey techniques to quantify the presence of debris, and we will categorize the debris according to type. Students will be required to write an individual lab write-up for the class marine debris project that includes an introduction, methods, results, and discussion section. More details for the project will be provided on site.

Grading of the Marine Debris Project will use the following criteria:

- Organization: The write-up is organized and structured with the appropriate sections.
- Concept: Student demonstrates an understanding of why and how the project was completed.
- Interpretation: Data is neatly presented, analyzed, and the results are adequately discussed.
- Effort: Student demonstrates that concerted effort has been invested into the process.
- Group Participation: Contributed to the project in the field, collecting, sorting, and analyzing debris.

3. Research Project – 15%

The importance of establishing research/monitoring projects and protocols is one of the themes that will be focused on during our time in Australia. With this in mind, students will develop a research and/or monitoring proposal with the vision that it will be implemented in the future by researchers, students, or citizen scientists. The project can draw on theory provided in lectures, articles, field activities, and practice from other monitoring exercises conducted during the program. Students will work in small groups (~3 students) to draft a proposal and present their plan to the rest of the class. The proposal should include the following sections:

I. *Project Summary*
A short synopsis that concisely summarizes the project (comparable to an abstract)

II. *Background Information:*
Description of the system (study area, feature, species, etc…).

III. *Study Objectives*
Presents the objectives, key questions, hypotheses, and goals of the study.

IV. *Methods and Materials*
Describes the experimental approach of the proposed study. What field and lab methods will be required, what materials and equipment are needed, how often will sampling occur.

V. *Data Analysis:*
What kind of data will be produced, and how will it be analyzed, managed, and disseminated.
*Address any limitation that there might be in your study in this section

VI. *Expected Significance and Broader Impacts*
Why is this research important and what will be gained from it. What are the broader impacts (e.g. will it provide student opportunities, benefits to the community, any products/technology developed from the work)

Grading of the Research Project will use the following criteria:

- Organization: Project is organized and presented in a logical way that follows the above format.
- Content: Provides an appropriate amount of information that fully presents the proposed study. The proposal convinces the reader why it is important and necessary, and demonstrates that the students have thoroughly thought through the *what* will be done, *how* it will be done, and *why* it will be done.
- Clarity: The proposal should be easy to understand, with concrete objectives and a clear plan.
- Effort: The proposal demonstrates that concerted effort has been invested into the process.
- Written Summary and References: Group completes the written summary as instructed (written summary instructions provided on site) and literature that was used is cited.
- References: If literature was used, it needs to be cited.
- Presentation Style: Groups can comfortably articulate their study to the rest of the group and answer questions.
- Group Participation: Individuals are active participants in the group process, and work is evenly shared.

4. Field Quizzes – 10%
During the course at least two field quizzes will be administered to test the student's knowledge of species and geologic features they have observed, field survey methods, research and conservation techniques, and data analysis and interpretation.

5. Final Exam – 20%
In the last few days of the program, students will take a written exam to assess their understanding of key themes and concepts related to research methodologies, the process of undertaking scientific investigations, data analysis and interpretation, and the role that science plays with informing policy and management decisions. The exam will primarily include short and long essay questions that assess the student's ability to demonstrate thorough comprehension of themes covered during the program.

6. Participation & Discussions – 10%
Students will be evaluated based on their general engagement and enthusiasm with all field activities, particularly when assisting with research and conservation efforts at the field stations and their contribution to group/peer projects. It is important for students to have a positive attitude and to be respectful to each other and anybody else who they are working with in the field. Students will also be evaluated based on their willingness to participate and engage in discussions regarding the scientific literature that we read. During the course, students may be assigned certain papers where they will assume the leader role of the discussion.

ESCI 497V, Wildlands Environment and Culture (5 quarter / 3.35 semester credits)

1. Cultural Journal – 40%

The cultural journal is an integral part of the Australia program and the ESCI 497V course. It is used to document interactions with local experts, and as a way to keep track of one's own personal development, awareness, and socio-cultural insights that are gained during the program. It will also include a dictionary of culturally relevant themes/words.

Students will be instructed on the best way to organize their cultural journal at the start of the program, and the journal will be collected periodically during the program for review and in the last week of the program for a final review.

The field data notebook will consist of the following components:

i) Guest Speaker Summaries (10%): We expect to be learning from local researchers and experts during the program. For certain interactions, students will be instructed to complete a guest speaker summary in their cultural journal. These entries are not meant to be time consuming and should only take 10-15 minutes to complete. The summary should include the following elements:

Name of Presenter:	**Date:**
Topic:	**Location:**
• Provide 3 - 4 bullet points describing key information that you learned during the presentation. ***Question*** : Write one question that came to your mind related to the presentation topic.	

Grading of the guest speaker summaries will use the following criteria:

- Organization: Entries follow the format established above.
- Completeness: Includes a completed entry for all guest speakers.
- Accuracy of Content: Provides an accurate overview of the presentation.
- Clarity: The entry should be well-written, easy to read, with concise bullet points, and a clear question.
- Effort: The entries should demonstrate that the student paid attention during the presentation.

ii) Reflections/Creative Entries (20%): At least 4 thorough entries or more if shorter more regular entries are preferred. Students will develop a "social-ecological autobiography" (See Hayes manuscript) in their cultural journal. This includes regular insightful reflections on learning experiences embedded within specific contexts, which can include but is not limited to interactions with guest speakers, local communities, other travelers, your peers, and the course readings. These entries are meant to challenge the student to tap into their creative side and to find awareness of how their own views and values have been brought into focus or shaped by the experience. Examples of themes that entries might highlight include 1) changes in personal beliefs, perceptions, worldviews and learning, possibly as part of comparative reflection to past experiences/knowledge/places encountered back in your homeland, 2) Key elements and information that finds resonance (appeal) or dissonance (conflict) within you, 3) creative writing about a location/experience that incorporates local cultural beliefs and traditions. Poetry and art are welcomed as individual shorter entries or to complement longer entries.

Each entry begins with the phrase: "*Right now I feel…*" before continuing on to whatever it is you wish to write about (the theme of the entry does not need to be related to your "*Right now I feel…*" statement).

Grading of reflections/creative entries will use the following criteria:

- Consistency of Use: Entries are completed regularly throughout the program (1 entry per week)
- Concept: Entries are creative and demonstrate a high level of contemplation. The theme or experience is explored in depth, from different angles, and incorporates philosophical, social, or creative reflection.

Entries use learning experiences to make insightful links between themes, readings, and experiences prior, during, and beyond the program.
- Style: Entries are well-written, and make use of narrative, prose, poetry, art, etc..
- Effort: A genuine effort to write thoughtful, creative reflections is demonstrated.

iii) Cultural Dictionary (10%):
The cultural dictionary is a comprehensive list of Australian words and phrases as well as unique cultural components (symbols, names, etc.) that are encountered throughout the program. When including indigenous terms, students should include either a translation of the word or describe the cultural significance of the concept. The dictionary can also include elements that define modern-day Australian society that a student finds to be unique or different from their hometown. The dictionary should be organized in the back of the cultural journal using the table format below.

Cultural Element (Word, Symbol, Concept, etc.)	English Translation and/or Cultural Significance
Dot Painting	Form of art unique to Indigenous Australians that involves…..

Grading of the cultural dictionary will use the following criteria:

- Accuracy: Student makes an effort to spell accurately and appropriately identifies the significance.
- Consistency of Use: Student demonstrates an attention to new words/phrases/cultural elements that are encountered throughout the program.
- Effort: Reasonable effort has been invested throughout the program.

2. Reading Summary Narratives – 10%

As a group, we will make our way through reading selections that are focused on Australian culture and history. We will periodically get together for "storytelling" sessions. During this time, we may read certain selections out loud, and students will take turns being in charge of guiding a discussion based on the reading or by providing a synthesis of the material. More information regarding reading groups and assignments will be provided during the program.

Grading of Reading Summary Narratives will use the following criteria:

- Synthesis: Student groups successfully synthesize readings and are able to pull key concepts/ideas/information from their assigned sections and reiterate them to the rest of the class in a logical way that can be easily understood.
- Narrative: Student groups deliver the information to the rest of the group in an engaging way and are able to divide the narrative between individuals in the group so that everybody participates in the "storytelling" process. During group narratives, students demonstrate that they are comfortable and familiar with the information that they are sharing with the rest of the class, including being able to answer questions.
- Group Participation: Individuals are active participants in the group process.

3. Final Reflection – 10%
Students will prepare a final reflection (3-4 pages) on the development of their worldview throughout the program that serves as a synthesis of elements included in their cultural journal. Students will detail their worldview and place it in context alongside other (cultural and ecological) worldviews studied or encountered during the program. Students may integrate their ideas about where and how their own perceptions and beliefs were challenged, dislodged, or reinforced. Students are encouraged to make links with ideas about their own evolving naturalist intelligence and/or social-ecological connectedness, and to refer to the people (i.e. from peers, presenters, locals, researchers, travelers, etc..), relevant readings, and personal experiences that have been of significant influence throughout the program. The final reflection serves as an additional and final entry for the cultural journal.

Grading of the Final Reflection will use the following criteria:

- Organization and Structure: Ideas are logically ordered and cohesive
- Analysis: Clearly identifies key contrasting perspectives encountered during the program and explains the role they have played in contributing to one's own worldview.
- Synthesis: Integrates different perspectives and articulates a distinct set of values or way of looking at the world.
- Style: Reflection is well-written, writing is succinct and engaging, and key points are effectively conveyed.
- Effort: A genuine effort to write a thoughtful, creative final reflection is demonstrated.

4. Field Quizzes – 10%
During the course at least two field quizzes will be administered to test the student's knowledge of Australian culture and history, information provided by local experts, and social/environmental issues that have been discussed.

5. Final Exam – 20%
In the last few days of the program, students will take a written exam to assess their understanding of key themes and concepts related to Australian culture, history, traditions, and how the landscape has shaped the Australian way of life. The exam will primarily include short and long essay questions that assess the student's ability to demonstrate thorough comprehension of themes covered during the program.

6. Participation & Discussions – 10%
Students will be evaluated according to active participation in everyday activities as well as their attitude and involvement when engaging with guest and local hosts. In this particular course, it is important that the student demonstrates a genuinely open mind, a willing attitude, and a respectful etiquette in interacting with team members and local groups. Finally, the student's consistent and positive contribution to the team dynamic (e.g. by embracing assigned roles and responsibilities) will be taken closely into account.

V. Grading Scheme
To convert final grade percentages to letter grades for each course that will appear on your transcript, we will use the following grading scheme:

Grade	Percentage	Grade	Percentage	Grade	Percentage	Grade	Percentage	Grade	Percentage
		B+	87.5 - 89.9	C+	77.5 - 79.9	D+	67.5 - 69.9	F	< 59.9
A	92.5 - 100	B	82.5 - 87.4	C	72.5 - 77.4	D	62.5 - 67.4		
A-	90.0 - 92.4	B-	80.0 - 82.4	C-	70.0 - 72.4	D-	60.0 - 62.4		

VI. General Reminders

Academic Integrity is as relevant in this field course as it is at your home institution. Plagiarism, using the ideas or materials of others without giving due credit, cheating, or putting forth another student's work as your own will not be tolerated. Any plagiarism, cheating, or aiding another to cheat (either actively or passively) will result in a zero for the assignment. Cases of academic dishonesty may be reported to your home institution.

Assignment deadlines are established out of fairness to other students, and they are necessary so the instructors can get the grading done on time. Therefore, deadlines are firm and work that is turned in late will be penalized and receive a 5% deduction. If the assignment is more than 2 days late, an additional 10% will be taken off. If you think circumstances may keep you from completing your work on time, talk to the instructor as soon as possible and certainly before the assignment is due.

Participation and attendance are crucial throughout this program. Because of the demanding schedule and limited time, all components of the program are mandatory (unless indicated) and missing even one lecture can have a proportionally greater effect on your final grade. Hence, it is important to be prompt and prepared with the needed gear and equipment for all activities.

Students with special needs or disabilities should meet with the lead faculty member as soon as possible to discuss any special accommodations that may be necessary.

VII. Required Materials

- **Three durable notebooks for coursework—** one for each class (ESCI 497T, ESCI 497U, and ESCI 497V). These notebooks will be used for your class assignments, and they will periodically be turned in to be graded. We strongly recommend Rite in the Rain notebooks (Softcover side bound products that are 4.63 x 7 inches with 64 pages; NO gridlines).: You can find a three-pack for sale on Amazon using this This Link.

- **Additional durable notebook(s) for personal field/lecture notes—** To be successful in the program you will want to take notes during lectures and while we are in the field. For your lecture notebook(s), we recommend Rite in the Rain products as well. Students are often surprised by the quantity of notes they take. Consider bringing These Notebooks or something similar. You will use your lecture notes to complete the graded assignments that go in your coursework notebooks, to study for quizzes and exams, and to have lose leaf paper on hand.

  All notebooks are available directly from Rite in the Rain or Forestry Suppliers or other channels.

Alternative compact hardback or tough softback bound notebooks may be suitable for all the above as long as they are weather resistant. Whatever your choice, ensure the notebooks for your coursework contain at least **64 pages**, are durable, and can fit in a large Ziploc bag. Avoid cubic grid line formats. For all books, avoid soft cardboard covers. They deteriorate quickly.

-Pen(s), Pencil(s): Check what is best for your notebooks (e.g. Rite in the Rain often works best with pencil).

-Clipboard (*recommended): Good to have a hard surface for writing in your journals and for securing paper in the wind.

-Folder: To safely store any handouts or pamphlets. Bring some lose leaf sheets of paper in your folder for field quizzes and to use as scratch paper.

VIII. Academic Schedule & Course Content

Below is the schedule that we anticipate following during the Australia program. Reading discussions listed here are included in the reading list (section IX). Selections that will be used for the 'reading summary narratives' for ESCI 497V will be added to the schedule during the program. Dates for individual oral presentations will also be added at a later date, and specific dates for journal reviews will be determined on site. Please note that activities and due dates are subject to change. The exact schedule will be reviewed with students 1-3 days ahead of time, however, students should come with a flexible mindset and be willing to adapt to necessary changes.

Dates (2023)	Location	Lecture Topics & Activities	Reading Discussions	Assignments Due
Sep 29	Kuranda	Activities: Students arrive and are picked up from the airport Camp Set Up Group Dinner Academic Themes: Introductions Orientation (Program Structure and Expectations; Health Protocols; Camping Basics; Risk Management)		
Sep 30 – Oct 2	Kuranda	Activities: Journal Set Up Kuranda Markets Academic Themes: Academic Requirements and Syllabus Overview of Australia Introduction to Natural History How to Read Scientific Articles Intro to Field Sampling Techniques Types of Data	R1 – Sep 30 R2 – Sep 30 R3 – Oct 2 R4 – Oct 2	
Oct 3 - 5	Fitzroy Island	Activities: Travel from Kuranda to Fitzroy Island (Oct 3) Sea Turtle Rehabilitation Center Snorkeling and Tidepooling Surveys Marine Debris (Site 1) Academic Themes: Invertebrate Taxa and Characteristics Reef Formations Intro to Marine Debris Functional Role of Reef Fishes	R5 – Oct 3 R6 – Oct 4 Pgs 195-199 R7 – Oct 5	
Oct 6 - 10	Daintree	Activities: Travel from Fitzroy Island to Cow Bay (Oct 6) Snorkel Trip GBR Reef Monitoring Daintree National Park Marine Debris (Site 2) Mt. Sorrow Academic Themes: Rainforest Ecosystems and Plant Adaptations Ecosystem Threats: Invasive Species Diversity, Behavior, and Functional Roles of Reef Fishes Phytoplankton and Zooplankton Atmospheric Circulation and Climate Zones	R6 – Oct 6 Pgs 200-210 R8 – Oct 8 R9 – Oct 9 R10 – Oct 10 R11 – Oct 10	

Oct 11 - 15	Cooktown	Activities: Travel from Daintree to Cooktown (Oct 11) Farming and Food Systems Archer Point Cultural Exchange Marine Debris (Site 3) Academic Themes: Biological and Physical Carbon Pumps Oceanic Circulation Climate Change Basics Energy In Australia Wind Energy Human Connection to the Land	R12 – Oct 11 R13 – Oct 13 R14 – Oct 14 R15 – Oct 15	Field Quiz – Date TBD
Oct 16 - 19	Atherton Tablelands	Activities: Travel from Cooktown to Atherton (Oct 16) Curtain Fig Tree National Park Tolga Bat Hospital Crater Lakes Academic Themes: Biogeography and Evolution Plate Tectonics Fauna Adaptations Hydropower and Dams Agriculture in Australia Reforestation Conservation Strategies	R16 – Oct 17 R17 – Oct 18	Journal Review – Date TBD
Oct 20 - 24	Sheoak Ridge	Activities: Travel from Atherton to Sheoak Ridge (Oct 20) Academic Themes: Scientific Process and Analysis Research Projects and Data Analysis Concept of Wilderness and Land Management	R18 – Oct 20 R19 – Oct 22 R20 – Oct 24	Research Projects – Date TBD

Oct 25 - 28	Undara Volcanic NP	Activities: Travel from Sheoak Ridge to Undara Volcanic NP (Jul 17) Undara Lava Tube Academic Themes: Volcano Dynamics and Magma Types Climate History and Dynamics Resource Management Solar Energy Climate Policy	R21 – Oct 25 R22 – Oct 27	Marine Debris Lab Report – Oct 26
Oct 29 - 31	Townsville	Activities: Travel from Undara Volcanic NP to Townsville (Jul 20) Cape Pallarenda Conservation Park Birding Academic Themes: Estuarine Environments Mangroves and Seagrasses	R23 – Oct 30 R24 – Oct 31	Field Quiz – Date TBD
Nov 1 - 5	Airlie Beach	Activities: Travel from Townsville to Airlie Beach (Jul 25) Great Whitsundays Walk Snorkeling Academic Themes: Ocean Warming Ocean Acidification Sea Level Rise	R25 – Nov 2 R26 – Nov 4	
Nov 6 – 8	Babinda	Activities: Babinda Boulders Academic Themes: Climate Proxies Carbon Connections (Coral, Plankton, Volcanoes, and Weathering) Final Exams	R27 – Nov 6	A/B Finals – Nov 8
Nov 9 – 11	Cairns	Activities: Return to Cairns (Nov 9) Course Wrap Up Final Dinner Student Goodbyes (Nov 11) Academic Themes: Reflecting on Key Concepts Final Exams		Final Journal Review – Date TBD C Final – Nov 10

IX. Reading List

The course reader, including the readings listed below, will be compiled and emailed to students in advance of the program. Additional readings and guide books will be carried in a shared library.

R1: Parker A (2007) Natural History and Naturalist Skills.

R2: Purugganan M, Hewitt J (2004) How to Read a Scientific Article. Rice University.

R3: Field Sampling Techniques: Fact Sheet. LiMPETS Rocky Intertidal Monitoring Program: Curriculum Guide.

R4: Bauer-Civielloe A, Loder J, Hamann M (2018) Using Citizen Science Data to Assess the Difference in Marine Debris Loads on Reefs in Queensland, Australia. Marine Pollution Bulletin 135: 458-465.

R5: Emslie MJ, Bray P, Cheal AJ, Johns KA, Osborne K, Sinclair-Taylor T, Thompson CA (2020) Decades of Monitoring have Informed the Stewardship and Ecological Understanding of Australia's Great Barrier Reef. Biological Conservation 252: 108854

R6: Hixon MA (2015) Reef Fishes, Seaweeds, and Corals.

R7: Lamb JB, Willis BL, Fiorenza EA, Couch CS, Howard R, Rader DN, True JD, Kelly LA, Ahmad A, Jompa J, Harvell CD (2018) Plastic Waste Associated with Disease on Coral Reefs. Science 359: 460-462

R8: Ting DYP, Apgaua DMG, Campbell MJ, Cox CJ, Crayn DM, Ishida FY, Laidlaw MJ, Liddell MJ, Seager M, Laurance SGW (2016) Vegetation and Floristics of a Lowland Tropical Rainforest in Northeast Australia. Biodiversity Data Journal 4: e7599

R9: Taylor DL, Leung LK-P, Gordon J (2011) The Impact of Feral Pigs (*Sus scrofa*) on an Australian Lowland Tropical Rainforest.

R10: van Woesik R (2009) Calm Before the Spawn: Global Coral Spawning Patterns are Explained by Regional Wind Fields. Proceedings of the Royal Society B. 277: 715-722

R11: Harriott V, Goggin L, Sweatman H (2003) Crown-of-Thorns Starfish on the Great Barrier Reef: Current State of Knowledge, CRC Reef Research Centre

R12: Howe JP (2015) This is Nature; This is Un-Nature: Reading the Keeling Curve. Environmental History 20:286-293.

R13 Hayes M (2009) Into the Field: Naturalist Education and the Future of Conservation. Conservation Biology. 23(5):1075-1079

R14: Falkowski P (2012) The Power of Plankton. Nature 483:S17-19.

R15: Cullen-Unsworth LC, Hill R, Butler JR, Wallace M (2012) A Research Process for Integrating Indigenous and Scientific Knowledge and Determinants of Success in the Wet Tropics World Heritage Area, Australia. The Geographical Journal 178(4):351-365.

R16: Specht A, Specht RL (2005) Historical Biogeography of Australian Forests. In Australia and New Zealand Forest Histories, Ed. Dargavel J, Australian Forest History Society Inc. (1):1-7.

R17: Jansen A (2005) Avian Use of Restoration Plantings along a Creek Linking Rainforest Patches on the Atherton Tablelands, North Queensland. Restoration Ecology Vol. 13, No. 2, pp. 275-283.

R18: Feary S (2005) Indigenous Australians and Forests. In Australia and New Zealand Forest Histories, Ed. Dargavel J, Australian Forest History Society Inc. (1):9-15.

R19: Vos A, Davies K (2020) Landholder Perceptions of Revegetation on the Atherton Tablelands, far North Queensland. Ecological Management and Restoration. 1-8.

R20: Woinarski JCZ, Burbidge AA, Harrison PL (2015) Ongoing Unraveling of a Continental Fauna: Decline and Extinction of Australian Mammals Since European Settlement. Proceedings of the National Academy of Sciences 112(15):4531-4540

R21: Price G, Wood E (2014) Undara: A Legacy in Lava. Australian Age of Dinosaurs. Issue 11

R22: Bentley J (2018) Wicked Problems: An Idea whose Time has Come.

R23: McKenna S, van de Wetering C, Wilkinson J (2022) Port of Townsville Seagrass Monitoring Program: 2021. James Cook University Publication, Centre for Tropical Water & Aquatic Ecosystem Research (TropWATER), Cairns.

R24: Hughes TP, Day JC, Brodie J (2015) Securing the Future of the Great Barrier Reef. Nature Climate Change

R25: Pendleton L, Hoegh-Guldberg O, Albright R, Kaup A, Marshall P, Marshall N, Fletcher S, Haraldsson G, Hansson L (2019) The Great Barrier Reef: Vulnerabilities and Solutions in the Face of Ocean Acidification. Regional Studies in Marine Science 31: 100729

R26: Hughes TP, Kerry JT, Baird AH, Connolly SR, Dietzel A, Eakin CM, Heron SF, Hoey AS, Hoogenboom MO, Liu G, McWilliam MJ, Pears RJ, Pratchett MS, Skirving WJ, Stella JS, Torda G (2018) Global Warming Transforms Coral Reef Assemblages. Nature 556: 492-496

R27: Laszlo KC (2012) From Systems Thinking to Systems Being: The Embodiment of Evolutionary Leadership. Journal of Organizational Transformation & Social Change 9(2): 95-108